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A contribution to the knowledge on the diet and food preferences of *Darevskia praticola* (Reptilia: Lacertidae)§

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Abstract. The Meadow lizard (*Darevskia praticola* s.l.) is one of the more poorly-studied lizard species in Europe, and no detailed data on its diet is available. We investigated a total of 180 faecal samples of *D. praticola* s.l. from two locations in Bulgaria, and conducted a comparison between sex and age groups (adult males, adult females, and immatures). In addition, the correlations between the consumed prey and the available resources were also analysed. Food selectivity was analysed by comparing the faecal samples with pit-fall trap samples on the basis of abundance of prey items from particular operational taxonomic units (OTUs). Results indicate that the diet of the Meadow lizard contains mainly arthropods (insects and spiders) and the most abundant prey items belong to Araneae, Auchenorrhyncha, and Coleoptera. According to the used electivity indices none of the OTUs are highly preferred by *D. praticola* s.l., but Formicidae are the most avoided OTU for all sex/age groups. Differences in food preferences can be found between adults and immatures, while differences among males and females seem to be insignificant. The lack of clear differentiation between males and females could be a result of their similar size and locomotor ability. In conclusion, our results reveal that *Darevskia praticola* s.l. is a generalist and it shows no food specialization due to its narrow spatial niche.

Keywords. Faecal samples, keratophagy, trophic niche, saurophagy, Sauria.

INTRODUCTION

Dietary studies play a key role in understanding lizard ecology and knowledge on feeding ecology is of crucial importance in establishing the interactions among species. European lizards from the family Lacertidae feed on a wide variety of arthropods and therefore they could be considered generalist predators which do not exhibit well-defined patterns of prey selection. Nevertheless, there are data which show that (at least) some lacertid species have precisely defined patterns of food selection (e.g., Díaz, 1995; Carretero, 2004). In the last decades, numerous studies on food preferences and trophic ecology of lacertids were conducted (Arnold, 1987; Carretero and Llorente, 1993; Capula and Luiselli, 1994; Pérez-Mellado et al., 2011; Crovetto and Salvidio, 2013; Mamou et al., 2016, 2019), although there are still many gaps in dietary research in some species and/or regions.

The Meadow lizard (*Darevskia praticola* s.l.) occurs only in SE Europe and its distribution is limited to parts of NE Serbia, S Romania, Bulgaria, NE Greece, European Turkey, SW Russia, and NW Georgia (Sillero et al., 2014). The taxonomic status of the Meadow lizard populations from the Balkans is still not fully clarified (Doronin and Ljubisavljevic, 2014; Freitas et al., 2016; Saberi-Pirooz et al., 2018). Moreover, *D. praticola* is one of the least-studied European lizard species in regards of ecology and especially trophic niche. In Bulgaria, this species has a

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widely but very sporadic distribution, from the sea level up to about 1100 m a.s.l., yet is missing from the south-western part of the country (Stojanov et al., 2011).

Stugren (1984) summarised all available data for *D. praticola* and found that quantitative analyses of the food composition were lacking. Some data on the diet are presented for the Eastern (sub)species (e.g. Terentyev and Chernov, 1949; Bannikov et al., 1971; 1977), but the trophic spectrum of *D. praticola* s.l. from the Balkans and adjacent areas remains unstudied.

The aim of the present study was to document the diet and feeding preferences of *D. praticola* s.l. in Bulgaria, including possible intraspecific variation. In that sense, the following work hypotheses were formulated: 1) considering what is found in other lacertids, immatures should be unable to eat large prey items, therefore their trophic spectrum should be narrower than that of adults; 2) considering what is found in regard to microhabitat choice and sexual size dimorphism of *Darevskia praticola* s.l., there should be no substantial differences between sexes in their food preferences.

MATERIAL AND METHODS

Study area

For the sampling, we chose two sites in western Bulgaria: the first site was situated at the east coast of the Ogosta Reservoir, 3.5 km from the town of Montana (43.3739° N, 23.2086° E, 180-240 m a.s.l.), and the second was situated in the Sredna Gora Mts., near Gabrovitsa Village (42.2602° N, 23.9208° E, 430-570 m a.s.l.). According to “World-Clim v.2” (Fick and Hijmans, 2017) the annual mean temperature is 11.3 °C for Ogosta and 10.6 °C for Gabrovitsa, and the annual precipitation is respectively 624 and 568 mm (the values are extracted from the respective freely available GIS-layers with original resolution ≈ 1 km^2 cell). More detailed descriptions of the studied sites are given by Vacheva et al. (2020).

Sampling

For the purpose of the study, we used a faecal samples analysis: a non-invasive method which, despite of some limitations (e.g., impossibility for prey recognition in such taxonomic level as by direct analysis of the stomach content), provides adequate results in dietary studies (Bombi and Bologna, 2002; Luiselli et al., 2011; Pérez-Mellado et al., 2011). Lizards were captured in 2013, 2014 and 2016 in Ogosta and in 2017 and 2018 for Gabrovitsa. A total of 53 field days were conducted, as follows: Ogosta – 28 days and Gabrovitsa – 25 days. Lizards were captured by hand and were measured (snout-vent length, SVL) with a transparent ruler to the nearest 1 mm. For each captured lizard, sex and age class were recorded. Age was not determined directly but estimated from body size and sexual secondary characters, so two age groups were defined: adults (SVL > 45 mm) and immatures (SVL between 24-44 mm). All of the captured lizards were placed separately in plastic boxes until defecation and after that, released at the site of capture. Faecal samples from each lizard were preserved in separate test tubes with ethanol for further examination under stereoscopic microscope (magnification 10-40X). Invertebrate remnants were identified to the lowest possible systematic level (in most cases to the level of Order). Collected invertebrates (both from the faecal and trap samples) were categorized with regards to their hardness (hard, intermediate, soft) and evasiveness (sedentary, intermediate, evasive) in accordance with Verwaijen et al. (2002) and Vanhooydonck et al. (2007).

Food resources were evaluated by pit-fall traps, which is a widely used method in similar studies (see Vacheva and Naumov, 2020 and references therein). A total of 24 pit-fall traps were exposed (10 meters apart) in four different habitat types (river bed, meadow, deciduous forest and the ecotone between the meadow and the forest). This was done only in Gabrovitsa for 23 and 17 days in spring, and 16 and 23 days in summer for 2017 and 2018 respectively. Collected invertebrates were identified to the lowest possible taxonomic level. We use the term “operational taxonomic unit” (abbreviated as OTU) instead of the term “taxon” for the invertebrates from both feacal samples and traps, because here the individual taxa are considered without taking into account their rank.

Statistics

Taxonomic diversity in the diet of *D. praticola* s.l. was analysed by Rényi’s index family (diversity profiles), which is considered one of the most useful methods for ordering communities according to their diversity (see Tóthmérész, 1995). The significance of differences in diversity between the separate samples (adult males, adult females, and immatures) was assessed by a permutation test, based on the diversity indices of Shannon (H) and Simpson (1-D).

Food selectivity was analysed by comparing the faecal samples with trap samples on the basis of abundance of individuals from particular OTUs (standardized toward total number of individuals in the sample). The electivity was described by the indices of Ivlev (E) and Vanderploeg and Scavia (E*) (see Ivlev, 1961 and Vanderploeg and Scavia, 1979, respectively). Both indices take values from -1 to +1, where the positive values indicate that the respective component is preferred, and the negative – it is avoided (for a detailed review of the electivity indices see Lechowicz, 1982).

Spearman's rank correlation coefficient was used to test for correlation between abundance and frequency of the prey items. A Chi-square test was used for the comparison between sexes and between age groups, regarding the categories of evasiveness and hardness of the nutritional components.

Calculations of the diversity indices, as well as statistical tests, were done using PAST 3.21 (Hammer et al., 2001). The electivity indices were calculated in Microsoft Excel (2010) after manual input of the respective formulas.

RESULTS

A total of 180 faecal samples from *D. praticola* s.l. were collected – 31 from Ogosta and 149 from Gabrovitsa. Among them, 136 from adults (70 male and 66 female) and 44 immatures. The distribution of the material from the faecal samples of *Darevskia praticola* from Ogosta and Gabrovitsa is presented in Appendices 1 and 2. The identifiable invertebrate remnants could be attributed to 622 individual specimens: 100 from Ogosta and 522 from Gabrovitsa (Appendix 3). The average number of invertebrates found in the faecal pellets was 3.46 (3.23 for Ogosta and 3.74 for Gabrovitsa), and the maximum was 15.

A total of 23 OTUs were identified in the faecal samples, and most of them were the same for both study sites. In Gabrovitsa more OTUs were observed – 22, in contrast to Ogosta where only 15 OTUs were observed (Appendices 1 and 2). Dermaptera, Formicidae, Gastropoda, Mecoptera, Myriapoda, Pseudoscorpiones, and Scorpiones were recovered only from Gabrovitsa, while Hemiptera were found only in the samples from Ogosta. Among all of the OTUs, the most abundant and frequent for Ogosta were Araneae and Coleoptera, as well as Blattodea but only by frequency of occurrence, while in Gabrovitsa predominant by both number and frequency were Araneae, Auchenorrhyncha, and Insecta indet. (Fig. 1). The correlation between abundance and frequency of occurrence of OTUs for the two sites was positive and with very high level of statistical significance (Table 1).

The total number of OTUs registered in the pitfall traps at Gabrovitsa was 25. Most abundant OTUs were Formicidae, Aranea, and Coleoptera (Appendix 3). According to the electivity indices, none of the OTUs were highly preferred by *D. praticola* s.l. (Table 2). The highest values for both indices were observed for Blattodea for males, for Insecta larvae for females and for Hymenoptera (excl. Formicidae) in immatures. On the other hand, with lowest values of the indices (close to -1) were Formicidae for all of the three sex/age groups (the index values for immatures are not presented in the table).

According to the Rényi's profiles (Fig. 2) the highest diversity of the diet was observed in males, and likewise diversity in the diet of adults was higher than in immatures. Statistically significant differences between adult males and immatures were established for the sample from Gabrovitsa with respect to the Shannon index (Table 3); the number of registered OTUs in adults was 22, while for immatures this was only 13. While the total number of OTUs was lower for Ogosta, this could be due to the lower sample size, and a total of 13 OTUs were observed in adults, compared to only 9 in immatures. OTUs presented only in adults were Acari, Dermaptera, Gastropoda, Hemiptera, Heteroptera, Isopoda, Mecoptera, Myriapoda, Pseudoscorpiones and Scorpiones. None of these OTUs were present in immatures only. The total number of observed OTUs in males was 21, while in females this was 19; for Ogosta there were 11 and 8 OTUs respectively, and for Gabroivitsa, where the sample size was larger – 20 and 18 respectively. OTUs observed only in males were Isopoda, Hemiptera, Dermaptera, and Scorpiones, while in females Lepidoptera, Mecoptera, and Myriapoda, but represented by single items.

Regarding the evasiveness of the prey, the highest values in faecal samples at both sample sites were sedentary prey items, and in terms of hardness, soft prey items were consumed more often (Table 4). The results of Chi-square test did not show statistically significant difference between all age/sex groups, in regards to neither evasiveness nor hardness of the prey items (Table 5).

In addition, parts of ingested tails and finger were discovered in the faecal samples. Cases of saurophagy were established in two adult males and one female from Gabrovitsa, i.e., in 2.01% of the samples from Gabrovitsa and 1.66% of total sample size. Keratophagy (the consumption of shed skin) was observed in two adults – a male and a female, or 1.34% of the samples from Gabrovitsa and 1.11% from the total sample size. Non-organic matter (grit) was recorded in three individuals, and plant matter was recorded in nine adults (five males and four females), which presents 5% from the total sample size (Appendix 2).

DISCUSSION

Our results suggest that *D. praticola* s.l. feeds mainly on arthropods, like many other lacertids, with insects

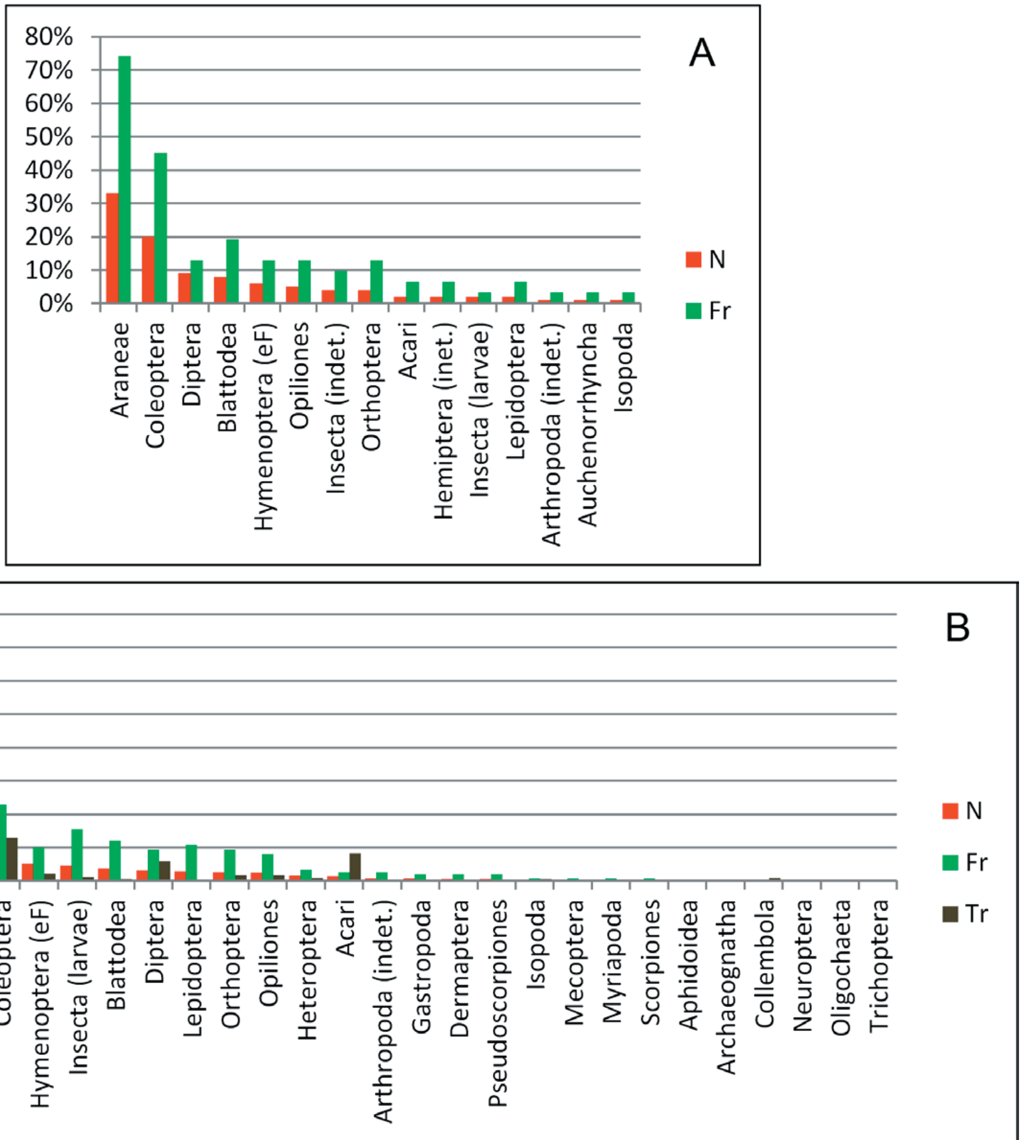

Fig. 1. Percentage of the invertebrates by OTUs according to: total number of specimens in the faecal samples of *D. praticola* (N); number of faecal samples in which the OTU occurs (Fr); total number of specimens, collected by pitfall traps (Tr). OTUs are in descending order according to the values of N.

being the predominant group – more than 60% of the total items recovered from the faecal pellets. Seven groups (Araneae, Auchenorrhyncha, Coleoptera, Insecta indet., Formicidae, and other Hymentoptera) composed more than 70% of the consumed prey, and among them the most abundant food source were spiders (more than 30%.) We also recorded OTUs that could be described as "dangerous prey", such as Dermaptera, Myriapoda, and Scorpiones, which were present with single individuals and in adults only.

In the available literature there are no detailed data about diet and food preferences in *D. praticola* s.l. In a few sources, a brief description of the most common prey was provided: Terentyev and Chernov (1949) state that the food of *Darevskia praticola* s.l. consists mainly of beetles (about 50%), orthopterans, arachnids, and dipterans. Bannikov et al. (1971) assign small insects, spiders, earthworms, molluscs and other invertebrates as prey to the Meadow lizards, specifying that among insects, small beetles, ants, orthopterans, leafhoppers, caterpillars, earwigs, aphids, as well as woodlice were the most consumed (Bannikov et al., 1977). The above mentioned has been confirmed by other authors (e.g., Orlova and Tertyshnikov, 1979; Tertyshnikov, 2002) and some anecdotal

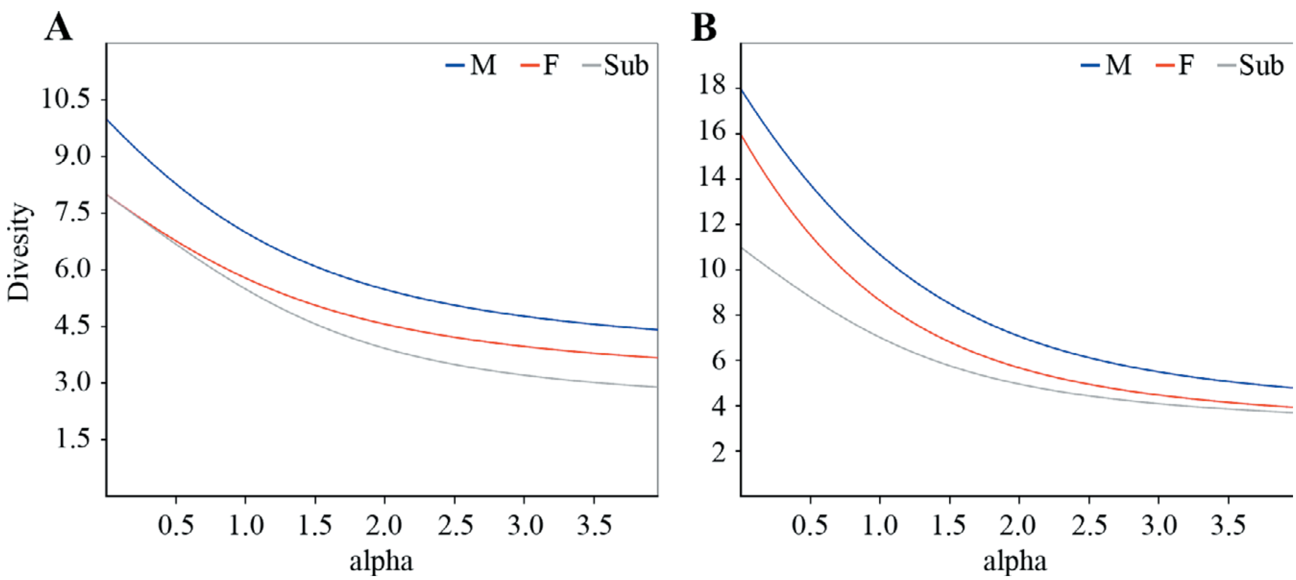

Fig. 2. Diversity profiles of the diet in males (M), females (F), and immatures (Sub) of *D. praticola* according to the abundance of OTUs in the faecal samples from Ogosta (A) and Gabrovitsa (B).

Table 1. Correlation (Rho) between abundance and frequency of OTUs in the faecal samples of male (M), female (F) and immature (Sub) *Darevskia praticola*, and its statistical significance (P).

		Rho	P
Ogosta	M	0.84	0.0023
	F	0.77	0.0476
	Sub	0.89	0.0179
Gabrovitsa	M	0.97	0.0000
	F	0.92	0.0000
	Sub	0.83	0.0014

data are reported in Stugren, 1984. Bischoff (1976) points out that the meadow lizard, like its relatives, preys on all edible invertebrates that can be overwhelmed.

Differences in food preferences were found between adult males and immatures, and the diet of adults in general was more diverse than that of immatures. It could be due to size limitation of the immatures (i.e., impossibility to consume large invertebrates), but also could be (at least partially) a result of the bias in terms of sample size differences (much smaller in immatures). In adults, the established lack of clear differentiation between males and females could be a result of their similar size and locomotor ability.

In term of evasiveness of the prey, less mobile prey categories were predominant, which can be explained by the fact, that the Meadow lizard is ground-dwelling and comparatively slow-moving species (Arnold, 1987).

Table 2. List of the most abundant (r > 5%) OTUs from the faecal samples of males (M), females (F), and immatures (Sub) of *Darevskia praticola* according to the electivity indices of Ivlev (E) and Vanderploeg & Scavia (E*); r = percentage in the faecal samples, p = percentage in the pitfall traps.

	OTU	r	p	E	E*
M	Blattodea	5.19%	0.55%	0.8084	0.3087
	Hymenoptera (eF)	5.19%	2.17%	0.4103	-0.3516
	Araneae	27.36%	18.39%	0.1961	-0.5402
	Auchenorrhyncha	8.49%	7.14%	0.0865	-0.6147
	Coleoptera	5.19%	12.81%	-0.4234	-0.8497
	Formicidae	12.74%	36.60%	-0.4837	-0.8695
F	Insecta (larvae)	6.02%	1.22%	0.6630	0.0611
	Araneae	31.94%	18.39%	0.2694	-0.4307
	Auchenorrhyncha	12.04%	7.14%	0.2555	-0.4428
	Coleoptera	9.72%	12.81%	-0.1369	-0.7038
	Formicidae	7.87%	36.60%	-0.6461	-0.9061
Sub	Hymenoptera (eF)	6.38%	2.17%	0.4927	0.3822
	Auchenorrhyncha	17.02%	7.14%	0.4091	0.2891
	Araneae	30.85%	18.39%	0.2532	0.1213
	Coleoptera	8.51%	12.81%	-0.2016	-0.3286

Regarding the hardness of the prey, predominant were soft prey categories. In view of the relatively small head size in comparison to body size (personal data), *D. praticola* s.l. probably avoids highly chitinized invertebrates.

Cannibalism and saurophagy in general, has been observed more often in island populations, where it could be caused by high lizard density and scarce food

Table 3. Diversity indices of the diet in males (M), females (F), and immatures (Sub) of *Darevskia praticola*, and the statistical significance of the differences between them (Permutation P).

Index value				Permutation P		
		Ogosta	Gabrovitsa		Ogosta	Gabrovitsa
Simpson 1-D	M	0.82	0.86	M vs. F	0.29	0.36
	F	0.78	0.82	M vs. Sub	0.07	0.19
	Sub	0.75	0.80	F vs. Sub	0.42	0.72
Shannon H	M	1.95	2.37	M vs. F	0.17	0.14
	F	1.76	2.16	M vs. Sub	0.09	0.002
	Sub	1.70	1.95	F vs. Sub	0.71	0.1

Table 4. Division of the invertebrates per categories of evasiveness (E1, E2, and E3) and hardness (H1, H2, and H3) as a percentage of all of the identified invertebrates in the faecal samples of male (M), female (F), and immature (Sub) *Darevskia praticola*.

		Ogosta			Gabrovitsa		
		M	F	Sub	M	F	Sub
Evasiveness	E1	44.68%	48.00%	55.00%	53.68%	60.82%	63.29%
	E2	25.53%	24.00%	10.00%	24.21%	22.16%	15.19%
	E3	29.79%	28.00%	35.00%	22.11%	17.01%	21.52%
Hardness	H1	59.57%	68.00%	80.00%	60.53%	56.70%	54.43%
	H2	8.51%	0.00%	0.00%	3.68%	3.61%	2.53%
	H3	31.91%	32.00%	20.00%	35.79%	39.69%	43.04%

Table 5. Chi-square test for the differences between male, female, and immature *Darevskia praticola* in regards to evasiveness and hardness of the prey items.

		Ogosta	Gabrovitsa
Evasiveness	$\chi 2$	2.14	4.73
	df	4	4
	P	0.71	0.32
Hardness	$\chi 2$	5.49	1.53
	df	4	4
	P	0.24	0.82

resource (Pérez-Mellado and Corti, 1993; Castilla and Van Damme, 1996; Cooper et al., 2015), while it is rare in continental populations (Simović and Marković, 2013). Cases of saurophagy were more frequent in males, as males often display more aggressive behaviour to other conspecifics (Castilla, 1995), and the presence in females mentioned here is interesting. On the base of the pholidosis, we determined that the remnants of the consumed lizard parts in the faecal samples of *D. praticola* s.l. belong to representatives of Lacertidae family, but because of the presence of two other syntopic lacertids in Gabrovitsa (*Lacerta viridis* (Laurenti, 1768) and *Podarcis muralis* (Laurenti, 1768)), we can suggest only saurophagy, as far as there are no direct evidence for cannibalism. Until now, cases of (partial) saurophagy, were not established for *Darevskia praticola* s.l., and this is the first observation to our knowledge. The only known record of saurophagy in another member of the *Darevskia* genus was mentioned for an adult female *Darevskia brauneri* (Méhely, 1909) that fed on a juvenile *Lacerta agilis* (Golynsky and Doronin, 2014).

Another interesting feeding behaviour, keratophagy (the ingestion of shed skin), was observed for the first time in *D. praticola* s.l. Keratophagy was previously known for only four lacertids (Mitchell et al., 2006 and references therein) but in more detailed dietary study it was recorded for the Viviparous lizard *Zootoca vivipara* (Lichtenstein, 1823) (see Vacheva, 2018; Vacheva and Naumov, 2020), where keratophagy was present in more than 9% of the samples, as well as in two other lacertids (*Podarcis muralis*, and *Lacerta viridis*), hence this event seems to be more common than previously thought and probably has more complex and important evolutionary significance.

The Meadow lizard is a species with very limited spatial niche and it is a typical forest inhabitant, strongly associated with deciduous forests (mostly oak forests)

(Vacheva et al., 2020). As an active and effective thermoregulator, with a preferred temperature close to the lower limit of mean body temperatures in comparison to other European lacertids (Ćorović and Crnobrnja-Isailović, 2018), it has to choose suitable thermal microhabitats. In that sense, the observed low food specialization can be explained mainly by the narrow spatial niche and the species can be categorized as a generalist in regards to its prey choice.

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APPENDIX 1

Distribution of the material from the faecal samples of *Darevskia praticola* from Ogosta per OTU (M, F, and Sub: males, females and immatures; Evas.: evasiveness category, E1, E2, and E3 refer to sedentary, intermediate, and evasive, respectively; Hard.: hardness category, H1, H2, and H3 refer to soft, intermediate, and hard, respectively; N: number of identified specimens; Fr: number of the faecal samples in which OTU occurs; eF: except Formicidae).

OTU	Evas.	Hard.	M		F		Sub		Total	
			N	Fr.	N	Fr.	N	Fr.	N	Fr.
Acari	E1	H1	1	1	1	1	0	0	2	2
Araneae	E1	H1	15	12	9	5	9	6	33	23
Arthropoda (indet.)			0	0	0	0	1	1	1	1
Auchenorrhyncha	E1	H3	0	0	0	0	1	1	1	1
Blattodea	E3	H1	2	2	3	1	3	3	8	6
Coleoptera	E2	H3	12	8	6	4	2	2	20	14
Diptera	E3	H1	6	2	1	1	2	1	9	4
Hemiptera (indet.)			2	2	0	0	0	0	2	2
Hymenoptera (eF)	E3	H3	3	1	2	2	1	1	6	4
Insecta (indet.)			4	3	0	0	0	0	4	3
Insecta (larvae)	E1	H1	0	0	2	1	0	0	2	1
Isopoda	E1	H2	1	1	0	0	0	0	1	1
Lepidoptera	E3	H1	0	0	1	1	1	1	2	2
Opiliones	E1	H1	4	3	0	0	1	1	5	4
Orthoptera	E3	H2	4	4	0	0	0	0	4	4

APPENDIX 2

Distribution of the material from the faecal samples of *Darevskia praticola* from Gabrovitsa per OTU (M, F and Sub: males, females and immatures; Evas.: evasiveness category, E1, E2, and E3 refer to sedentary, intermediate, and evasive, respectively; Hard.: hardness category, H1, H2, and H3 refer to soft, intermediate, and hard, respectively; N: number of identified specimens; Fr: number of the faecal samples in which OTU occurs; eF: except Formicidae OPI: other prey items).

OTU	Evas.	Hard.	M		F		Sub		Total	
			N	Fr.	N	Fr.	N	Fr.	N	Fr.
Acari	E1	H1	7	4	0	0	0	0	7	4
Araneae	E1	H1	58	41	69	46	29	20	156	107
Arthropoda (indet.)			2	2	1	1	1	1	4	4
Auchenorrhyncha	E1	H3	18	17	26	22	16	13	60	52
Blattodea	E3	H1	11	9	7	7	2	2	20	18
Coleoptera	E2	H3	11	11	21	16	8	7	40	34
Dermaptera	E2	H1	3	3	0	0	0	0	3	3
Diptera	E3	H1	8	7	5	4	3	3	16	14
Formicidae	E2	H3	27	15	17	8	4	4	48	27
Gastropoda	E1	H3	1	1	3	2	0	0	4	3
Heteroptera	E2	H1	5	4	3	1	0	0	8	5
Hymenoptera (eF)	E3	H3	11	8	10	5	6	2	27	15
Insecta (indet.)			20	19	21	20	14	12	55	51
Insecta (larvae)	E1	H1	9	8	13	13	2	2	24	23
Isopoda	E1	H2	2	1	0	0	0	0	2	1
Lepidoptera	E3	H1	7	8	4	4	4	4	15	16
Mecoptera	E2	H1	0	0	1	1	0	0	1	1
Myriapoda	E2	H1	0	0	1	1	0	0	1	1

OTU	Evas.	Hard.	M		F		Sub		Total	
			N	Fr.	N	Fr.	N	Fr.	N	Fr.
Opiliones	E1	H1	4	4	6	5	3	3	13	12
Orthoptera	E3	H2	5	5	7	7	2	2	14	14
Pseudoscorpiones	E1	H1	2	2	1	1	0	0	3	3
Scorpiones	E1	H1	1	1	0	0	0	0	1	1
OPI (cannibalism)				1		1		1		3
OPI (keratophagy)				1		1		0		2
OPI (grit)				3		0		0		3
OPI (plant material)				5		4		0		9

APPENDIX 3

Distribution of the material from the pitfall traps in Gabrovitsa per OTU (Evas.: evasiveness category, E1, E2, and E3 refer to sedentary, intermediate, and evasive, respectively; Hard.: hardness category, H1, H2, and H3 refer to soft, intermediate, and hard, respectively; eF: except Formicidae).

OTU	Evas.	Hard.	N
Acari	E1	H1	832
Aphidoidea	E1	H1	22
Araneae	E1	H1	1839
Archaeognatha	E1	H1	9
Auchenorryncha	E1	H3	714
Blattodea	E3	H1	55
Coleoptera	E2	H3	1281
Collembola	E1	H1	83
Dermaptera	E2	H1	4
Diptera	E3	H1	586
Formicidae	E2	H3	3661
Gastropoda	E1	H3	16
Heteroptera	E2	H1	81
Hymenoptera (eF)	E3	H3	217
Insecta (larvae)	E1	H1	122
Isopoda	E1	H2	57
Lepidoptera	E3	H1	27
Mecoptera	E2	H1	1
Myriapoda	E2	H1	42
Neuroptera	E2	H1	3
Oligochaeta	E1	H1	10
Opiliones	E2	H1	168
Orthoptera	E3	H2	168
Pseudoscorpiones	E1	H1	2
Trichoptera	E3	H1	2